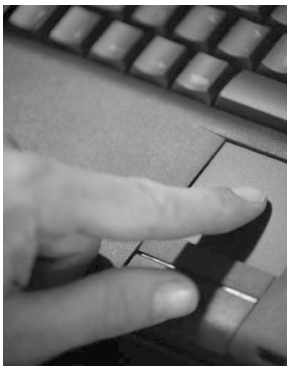

Situating Teacher Education: From the University Classroom To the "Real" Classroom

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Abstract

This article presents a descriptive case study on the first experience moving a required teacher preparation instructional technology course from the university classroom into an elementary school setting. The key motivation was to help future teachers become more adept at integrating technology into their practice by learning about commonly used applications and best practices in an authentic setting, framed within a constructivist approach. In addition to lab time focused on the acquisition of computer skills, the course design included classrooms visits and observations, conversations with teachers and the principal, and development of a lesson or unit plan. The format was an intense one-week workshop, meeting for six hours each day and cotaught by two university faculty and a school-based coordinator, instead of a quarter-long course meeting once or twice a week for two hours or less with a single instructor. Students reacted very favorably to the course format and location. Detailed analysis of the curriculum and future plans are described.

Fifth year teacher preparation programs face the daunting challenge of helping student teachers become proficient in a wide range of skills, as well as acquainting them with an extensive literature on education theory, teaching and learning practices, and many other topics, all in a short amount of time. Most new teachers exit teacher preparation programs feeling that there is much left to learn (Brush et al., 2001; Dusick, 1998). The perceived value of what students have learned in the university classrooms is slight, and their confidence that they will remember any of it by the time they get to their own classroom is even less (Abdal-Haqq, 1995; Hirumi, 2002). Effective use of technology to support personal productivity, and especially for teaching and learning, is just one area where teacher preparation programs are perceived as falling short. Specifically with regard to technology, whether at the teacher preparation stage or at the inservice stage, how to create effective and meaningful learning experiences that will carry over into a teacher's daily practice has been the subject of considerable effort and research. Bradshaw (2002) concluded:

> When staff development efforts include a presentation of theory and information, demonstration, practice with feedback, and coaching and followup over time, the transfer to the classroom and the return on investment in instructional improvement are significantly increased. (p. 134)

The key variable, thus, is "transfer to the classroom," meaning actual practice by the student teacher when they enter their own classroom (e.g., Cox, 1997; Salomon & Perkins, 1988). The gap between the university classroom, where most preservice preparation takes place, or between the hotel meeting rooms or similar venues, where most inservice staff development events happen, and the classrooms where teachers practice must be narrowed to the (ideal) point where the transfer rate is consistently high. One potential way to close this gap is to move teacher preparation courses into authentic venues. Examples of such efforts in teacher preparation can be seen in the areas of technology (Brush et al., 2001; Curtin et al., 1994), science methods (Eick, Ware, & Williams, 2003), reading (Newton, 1997), as well as literacy (Worthy & Patterson, 2001). Whether exposure to technology in teacher preparation programs is embedded in the context of other courses or in dedicated, "stand-alone" courses has also been investigated. For example, a survey conducted by the Milken Exchange on Educational Technology (1999) concluded:

> The most important finding of the survey is that formal stand-alone IT coursework does not correlate well with scores on items dealing with technology skills and the ability to integrate IT into teaching. IT coursework is a component of current technology standards for colleges of education and was cited by many survey respondents as a notable feature of their programs. Yet the current data do not support the idea that additional technology-specific coursework will greatly improve aspects of IT use in education. (p. 3)

In this article we aim to share our experiences providing technology training in our teacher preparation program that directly

addressed the need for contextual authenticity and maximized the likelihood of transfer of learned skills to the students' own classrooms. Our teacher preparation program currently has one two-unit course (ED271, "Instructional Technology for Teachers") dedicated to technology. What this means in practical terms is that students have one ten-week quarter where they take this course usually one day a week, in two-hour sessions. Given the new California state requirements expressed in Standard 9 (California Commission on Teacher Credentialing, 2001), this amount of time (20 hours of classroom instruction) is not adequate.

Situated Learning

Our approach to the redesign of the technology course was based on the principles of situated learning. Many factors influence how technology training takes place in teacher preparation programs, including the amount of time, the location itself, and differences in the availability of technology. Our goal with the experience described in this article was to reduce that gap between the place of instruction and the context of practice so that student teachers are more likely to use technology effectively in their own classrooms. Location is a factor in learning that educational institutions sometimes ignore for the sake of convenience. It is easier for students to congregate in a "place of learning" (e.g., school, university) and expect them to acquire knowledge, facts, information, attitudes, and skills that they should later be able to apply in the so-called "real world" outside. When the expectations fail, education institutions tend to place the responsibility with the students (it is they who "fail" to "apply what they learned") rather than critically examine the process itself.

For decades, many people have pointed out the importance of acquiring knowledge and putting it to use, or else risking that knowledge becoming stale. "With good discipline, it is always possible to pump into the minds of a class a certain quantity of inert knowledge. You take a text-book and make them learn it" (Whitehead, 1929, p. 17). Whitehead argued further against a disconnected curriculum that presents subjects such as algebra, geometry, science, and others "from which nothing follows" (p. 18). How to acquire knowledge that would be retained for a long period of time, and easily recalled in a variety of practical situations, is an important goal for many educators and others in society concerned about the poor performance after leaving school from students who had "done well" in the system (e.g., functionally illiterate high school graduates). Examinations of teaching methods have resulted in innovations that help teachers go beyond simple lecture, recitation, and memorization to include manipulables, collaborative activities in the classroom, grouping of students, interdisciplinary approaches, and many others.

Thinking about student learning in schools has led to many examinations of the roles of teachers in the learning process. There is general agreement about the influence of teacher performance on student achievement, just as there is for the saying that new teachers will "continue teaching the way they were taught" (Willis & Sujo de Montes, 2002, p. 76). The increasing presence of technology in all aspects of contemporary life has put pressure on school systems to better reflect the "real world" and bring technology (computers in particular since the 1980s) into classrooms. How to prepare teachers to work in technology-infused classrooms is a problem that raises many issues for teacher preparation institutions, as the faculty in those institutions tend to not be sophisticated users of technology themselves—and thus unlikely to teach future teachers how to teach with technology. Then, among the institutions that have integrated technology into their teacher preparation programs, the issue of effectiveness—meaning the degree to which future teachers actually use technology routinely in their practice—has become more salient. To recall Whitehead's (1929) argument, some researchers challenge whether the ways in which technology is being "taught" as a subject in teacher preparation programs is resulting in so much more "inert" knowledge, given that as Abdal-Haqq (1995) stated, "few teachers routinely use computer-based technologies for instructional purposes" (p. 1).

Brown, Collins, and Duguid (1989) presented the concept of "cognitive apprenticeship" in support of situated learning. In the field of teacher preparation, situated learning is the buttress for the Professional Development Schools (PDS) movement, where universities and schools (and/or school districts) partner to offer authentic learning settings for future teachers (e.g., Curtin et al., 1994; Naubert & Binko, 1998). Applying these notions to teacher preparation and the technology integration challenge specifically, learning how to meaningfully integrate technology into teaching can be seen as a process of enculturation into a community of practice.

Given the chance to observe and practice *in situ* the behavior of members of a culture, people pick up relevant jargon, imitate behavior, and gradually start to act in accordance with its norms. These cultural practices are often recondite and extremely complex. Nonetheless, given the opportunity to observe and practice them, people adopt them with great success (Brown, Collins, & Duguid, 1989, p. 34).

A few teacher preparation programs have translated these ideas into action in the form of "field-based" models (Brush et al., 2001). Practically all programs include an "immersion" component where students have to gradually increase their participation in classrooms activities, leading up to a "full take-over" towards the end of the program. Even in these models, when it comes to technology, what Brown et al. (1989) called "the breach between learning and use" (p. 32) is evident in the disconnection between the "educational technology" faculty and the "methods" faculty (Brush et al., 2001). However, Brush et al. have taken the important step of involving a number of local "partner schools" and are working with mentor teachers who, along with the student teachers they are supervising, are supported by one or two graduate students who provide both pedagogical and technical support.

Our approach took the next logical step, which is to move the technology course from the university classroom to a school. Unlike other field-based programs, in our case for this course there

was no university-based classroom time at all. Herrington and Oliver (1999) compiled a list of "nine characteristics of a situated learning framework, namely: an authentic context; complex authentic activities; multiple perspectives; expert performances; coaching and scaffolding; opportunities for collaboration, reflection and articulation, and authentic assessment" (p. 402). The following section provides further details on how our experience addresses these characteristics, how we selected the school, and other important considerations.

Selection of Setting

The choice of location for the course outside the university was simplified because of institutional and personal connections. Our department has a long-standing relationship with a local school district, centered on an internship program that has proved mutually beneficial over many years. At a personal level, the first author had worked at a corporation that had a working partnership with the same district and the specific school (K–6, organized in "villages:" K–2, 3–4, and 5–6), where a Teacher Development Center (TDC) had been created as a consequence of this partnership. Leveraging the ongoing work at the TDC, the authors started working with the TDC coordinator to review the facility's capacity (up to 15 students) and start collaborating on the creation of a curriculum for our course, which represented a shift at the TDC from inservice to preservice training.

A decision was made early on to modify the university course to align it more closely to the format used at the TDC. The course was changed from a quarter-long, once-a-week, two-hours-a-session format into an intensive workshop that would meet for one week, every day, for seven hours each day. The experience at the TDC with this format (Ringstaff & Yocam, 1994; Ringstaff, Yocam, & Marsh, 1996; Sandholtz, Ringstaff, & Dwyer, 1997) for inservice staff development opportunities had been quite successful. The TDC curriculum was also modified slightly to meet the new state teacher preparation requirements. The newly developed technology course was scheduled for the university's summer session (the start of our host school's fall session, which operates on a year-round schedule). Two separate week-long sections were conducted on consecutive weeks. To meet the host district's needs, the first week was reserved for interns from the district enrolled in our teacher preparation program (14 students), and the second week was open to interns from other districts and preservice candidates (11 students).

Course Description

Modifying the course, moving it from the university classroom to a school setting and changing the scheduled format, was only the first step. To meet the requests from student teachers for more "authentic" links between material covered in the classroom and what they anticipate needing in their practice, several requirements had to be met by the school site. Situating the course at the elementary school and TDC was possible because the school had adequate technology available for staff development purposes. Also, most or all of the teachers at that school are "master" technology-using teachers. By allowing the Interns and preservice student teachers to visit on-site classrooms and observe these teachers in their daily practice, these master teachers served as role models that, in the best case, made it easy for student teachers to convince themselves that they, too, could teach with technology. These ideas were further addressed in scheduled conversations during the workshop week, where master teachers and the school principal (a former teacher at the same school) shared their personal and professional stories.

Co-teaching was modeled in this course by the faculty leading it. Teaching is usually a profession where individuals do not collaborate on a regular basis. Multiple reports (e.g., Dwyer, Ringstaff, & Haymore Sandholtz, 1990) and other research argue for increased collaborations among K–12 teachers (e.g., Fontaine, 2000), and yet few teacher preparation institutions are actively addressing this goal in their curricula and in the practices of their faculties. If it is true that "teachers teach the way they were taught," modeling co-teaching in this course will likely encourage future teachers to work collaboratively when their time comes.

In sum, there were three main components to our course-as-workshop experience:

- The opportunity to observe teachers who routinely integrate technology into their daily practice, in their own classrooms and with their students, plus time to engage these teachers in conversations about their personal and professional evolution in regards to technology use.
- The hands-on workshops focused on specific hardware (e.g., computers, digital video cameras) and software applications (e.g., Inspiration, HyperStudio, AppleWorks).
- The requirement to work during the week on a curriculum standards-based lesson or unit of the student's choice, designed with the intention that it will be used in the classroom. Students were individually responsible for their work, but they were encouraged and given opportunity to collaborate and share ideas with their peers and the faculty during the development process.

In addition to daily attendance, students were required to complete reading assignments that provided a background on constructivist theory and technology integration. The readings were six issues of a newsletter (*TAP into Learning*) produced by the Southwest Educational Development Laboratory (SEDL, 1998, 1999, 2000a–d). Along with brief theory presentations, the newsletters (four of the six are eight pages long, and two are 12 pages long) described specific software applications and their classroom uses, which students subsequently used in the course. Although this is less reading material than what our students would encounter in other teaching preparation courses (including the university-based version of this course), we opted for a "quality over quantity" approach, also acknowledging that students were un-

likely to read and assimilate an excess of reading material overnight. The focused discussions every morning (see below), subsequent student evaluations, and our own reflections lead us to conclude that this is a reasonable expectation in this intensive format and also a productive one, in terms of the students' confidence in their ability to absorb the wealth of ideas and information presented in the readings.

Teaching the Course

Each day at 8:30 a.m., class started with a conversation. On the first day, introductions and a course overview took place. Each day thereafter the conversations focused on the topic of the reading assigned for that morning. We set this up as an opportunity for students and instructors to reflect together on key ideas, concepts, applications, and issues raised in the reading material. Two other types of activities took place in the morning. One was application-focused sessions led by one of the instructors, introducing software programs that students were encouraged to use when preparing the required lesson or unit plan. Among the programs presented were AppleWorks (word processing, spreadsheet, database), Inspiration, HyperStudio, Hollywood, iMovie, and MS Word.

Each student had access to his or her own desktop computer for the week. All the applications needed for the course were already pre-loaded on the machines. We encouraged students to practice individually ("free exploration" times were scheduled each day) and to consult freely with each other as they were learning about each application. Given the TDC layout, students sat in pairs at either side of the room (six on one side, eight on the other, and one in front if needed). The instructor station (including a computer projector) was in the middle towards the back of the room. In the center of the room were several tables and chairs arranged to accommodate everyone (students and instructors) around the perimeter. This conference table configuration was used for morning group discussions, conversations with teachers, and other meeting needs. This physical layout worked very well because it encouraged students to collaborate with each other. The proximity of at least two other students in front or in back made it easy to pose a question, for example, and get an answer from another student if none of the instructors were available immediately.

To learn software applications, students expressed a clear preference for a strategy in which the instructor starts from the very beginning (e.g., "This is what the icon for the application looks like in your hard disk") and builds gradually from there. We encouraged students to practice individually and to consult freely with each other as they were learning about each application. It is worth noting that all students were already familiar with personal computers, electronic mail, and Web surfing. Yet these students felt quite uncertain about their ability to master new applications in what they perceived to be a very short time. Also, students were apprehensive about their capacity to understand how the application could be used for teaching. We gained this and other valuable insights from a brief "competency survey" the students completed on the morning of the first day. Consequently, all three instructors made a point of emphasizing the value of a program's features to support specific teaching or learning needs, so that students would not focus excessively on the program for its own sake but rather kept the context of application in mind at all times.

The second typical morning activity was classroom visits. Working with the TDC coordinator, site teachers identified optimal days and times for our students to come through their classrooms. Because teachers gave us different times each day, our scheduled visits varied slightly from day to day. The classroom observations and conversations with teachers from the host school were very valuable to support the perspective on selection and use of applications based on their usefulness for teaching and learning. Students in our course had the opportunity to watch these teachers as they used the programs covered in the course in their routine work.

Reflection is a key component of teacher practice that we try to instill in our students. Each day started with a discussion of the reading assignments and, from day two on, with conversations about related topics from the previous day's work. The lunch meetings with the school's teachers were more than question-and-answer sessions on practical teaching issues. If needed, instructors gently guided these conversations toward issues of professional and personal development, focused on technology integration. We were particularly interested in having the teachers talk about their perceptions of students' attitudes toward technology, and their experiences working in technology-enhanced environments. Thus, in addition to the practical wisdom shared by the teachers (e.g., what to do if the lesson you've planned with technology can't happen because the network is down or some computers are broken), our students received first-hand reports on how children in today's schools readily adapt to meaningful uses of technology in everyday teaching and learning—and how much they like it and seem motivated by it as well. Thus, it was of great value for our students to see children from the host school demonstrate examples of their past work, by pulling up files in their electronic portfolios from the school's server, launching them, and retelling the purpose of the work. Several of our students remarked that they were very impressed by the familiarity with the technology the kids exhibited, and how pleased they seemed to be able to locate their work from years past and still remember so much about those projects or assignments.

Learning About Digital Video

One of the topics in our curriculum was digital video. When the student teachers first saw it listed in the syllabus, several students expressed reservations about the value or relevance of the topic. Asking them to suspend judgment, we did the following activity. Students were asked to form groups of no more than three people. The decision was made to allow students to form their own groups. Alternatively, we could have formed groups based on pre-selected criteria such as grade level or content area. One of the instructors distributed the digital video cameras to the groups, offered basic instructions on their use, and set out the terms of the assignment.

The assignment was for groups to go out and shoot film for about 20 minutes, with the only requirement being that each member of the group had to operate the camera as well as be on camera as the subject. Contrary to what "best practice" in video production suggests, we deliberately gave the students no time to prepare a script outline or storyboard. With limited time (less than four hours), we knew that students would spend too much time and effort up front trying to agree on script ideas and get frustrated when they then had too little time left for editing and "post-production"—adding video and sound effects, titles, and so on. The group product would be a video no more than two minutes long, including titles.

With no time to plan, students were quite creative and playful—one of the secondary objectives for the assignment. It came as no surprise that in the end, digital video was listed as their favorite activity for the entire week. All students very much liked the iMovie application, in part because it gave them a great sense of accomplishment by allowing them to come up, from start to finish, with a final product that they could be proud of despite the limitations of the lack of time and experience. Without exception, all students understood the value of group work in the context of a project-based assignment, and how video could be meaningfully incorporated into learning opportunities across all grade levels and subject matter.

Co-Teaching and Reflection

Both instructors and students perceived co-teaching this course as beneficial. From an instructor's perspective, having colleagues with whom to share the teaching responsibilities was a great relief, especially given the intensity of the course-as-workshop experience. Co-teaching also allowed us to see creative and alternative pedagogical styles that will no doubt influence our future teaching efforts. From the students' perspective, seeing different people lead sessions and having the other instructors to call on for help—particularly during the application-focused sessions and when working on their projects—was highly appreciated.

The requirement to produce a lesson or unit plan by the end of the week was stressful for most students, especially those with little or no classroom experience. Though students were given the opportunity to collaborate and rely on each other for help, students did not consult with one another as much as we, the instructors, expected. Because students were effectively paired by the location of the computers they were working on, students interacted with their immediate neighbor much more than with peers in front or to the back of them, and much less with peers at a greater distance. The atmosphere we aimed to create, one of open collaboration to produce an individual work, was successful only to a point. Students seemed uncomfortable sharing and collaborating as a matter of course, rather than as a "mandate" in the context of a group project. Nonetheless, it will be important to us to maintain the environment of open collaboration in future instances of this course to keep building a sense of the value of collaboration for teaching, learning, and professional development in our future teachers. One alternative we are exploring is to teach the course using laptops instead of desktop computers so the seating arrangements can vary more freely.

Learning from Experience

An exercise where we asked students to participate in the development of the evaluation rubric for their projects was a particularly salient experience for us as instructors. The first week, we scheduled this exercise for the fourth day. None of the students had ever participated in something like this, and several among them were clearly uncomfortable. As instructors, we realized that the main reason for the discomfort was the timing rather than the task itself. At the end of each day in both weeks the course was taught, we held a "Needs and Gots" session to reflect on what had happened. During that session at the end of the rubric exercise day in the first week, students agreed with one of their peers' view that although it was generally useful, the rubric exercise should have happened earlier in the week, when they were just getting going on the project, rather than later when they were closer to being done. In sum, although they appreciated the value of the exercise for achieving peace of mind surrounding the expectations for an assignment, moving it towards the beginning of the workshop was a unanimous recommendation.

Because we conducted two sessions consecutively, we were able to implement this suggestion and others derived from our own observations during the second week. In addition to moving the rubric creation exercise to the second day, we shifted the digital video session from the second to the third day. The intensity of the weeklong course format was a drain on the students. The feedback from the first week clearly indicated that working with digital video was among the favorite activities, and having it in the middle of the workshop provided a welcome shift from the first two days and seemed to energize students and recharge their motivation for the last two days. Other adjustments were made in the schedule mainly from opportunities to visit classrooms.

We also made changes in the way we presented specific applications (e.g., Inspiration, HyperStudio) based on our perceptions of success and student feedback. For example, during the first week, we introduced Inspiration by presenting a very elaborate diagram that included many of the software's advanced features, and then proceeded to work backwards to the basics. Because most students had trouble following the instructor's explanations of the features and how to execute them, along with commentary on strategies for integration, during the second week we approached this task in exactly the opposite way: Starting from the simplest functions and building gradually toward more advanced features and complex diagrams.

Student Evaluations

At the end of the week, we collected both quantitative student evaluations (a standard university form) and narrative evaluations

based on a questionnaire created by the instructors. Based on personal experiences and data from the competency survey we administered at the start of each session, one of our goals for the course was to instill in all participants a positive attitude toward technology for personal productivity, teaching, and student learning. Despite the time limitations, which made it impossible to dedicate more than a few hours to learning a new application, we were particularly interested in helping students see the value of each of the applications and activities in terms of their teaching practice. We agree with Ross, Hogaboam-Gray, and Hannay (1999) that "Teachers who interpret their interactions with computers as indicative of high ability grow in confidence, regardless of the frequency of their experience" (p. 93). Thus, we were interested in planting the seeds of a fearless attitude toward technology as opposed to focusing solely on getting students to "master" specific applications.

Our goals seemed to have been met, judging by the student evaluations. The quantitative university evaluation form contains 11 course-specific items, covering various domains. From week one (14 students) the lowest mean score (on a scale from 1 to 5, where 5 is highest) was 3.85 on the item "The course was well organized" (S.D.=0.86). The highest mean was 4.77 (S.D.=0.18) on the item "The instructors appear to enjoy teaching." The changes made for week two (11 students) indicate significant improvement. Only two items did not have a mean of 5 (highest), and they were still high (4.80 on "The course has contributed to my capacity for critical evaluation" and 4.90 on "He/She takes care to ensure that students are comprehending the subject"). Some of the positive comments received in the narrative feedback forms were:

- "Thanks for taking the time throughout the week to really ask us questions and feedback for changes or places for improvement."
- "I enjoyed it."
- "I really liked the iMovie application. I will be trying it with my class."
- "You were wonderful. I will miss this class."
- "Thank you. Seriously, this was the best class I took for all of my credential program. It was actually *useful*" [emphasis in original].

Less favorable comments focused on time pressures to complete the project and individual preferences when learning new technologies. The most significant feedback (from our perspective as instructors) was the recommendation to offer the course in a different venue for single-subject candidates, some of whom felt that although seeing technology in use in actual classrooms by real teachers with real students was definitely helpful, they would have benefited even more if the school was a middle or high school where the context of practice would be similar to that where they expect to work. We agree with this sentiment, and will explore possibilities among schools in our surrounding area.

Conclusions

Many barriers have been identified that block or limit the use of technology by teachers, both preservice and inservice. For preservice students, the time lag between exposure and practice, the difference in context of instruction versus context of practice, and the perceived relevance of what's learned in the university classroom versus what will be needed in the "real" classroom are among the most salient (cf. Milken Exchange on Education Technology, 1999). In the experience reported in this article we aimed to address several of the shortcomings at once, meeting all the "nine characteristics of a situated learning framework" listed by Herrington and Oliver (1999). The overarching goal for this course—and for our program in general—is to improve on the fact that "only 20% of teachers feel well prepared to integrate education technology into classroom instruction" (CEO Forum on Educational Technology, 1999, p. 10).

For preservice students in particular, having the class in a school (an "authentic context"), with adequate facilities, led by faculty members who model effective use of technology ("complex authentic activities," "multiple perspectives," "coaching and scaffolding"), being able to observe teachers who can serve as good models ("expert performances"), learning computer applications with clear connections to practice—and time to explore them on their own ("opportunities for collaboration, reflection, and articulation"), seeing elementary students relate to technology with ease and confidence ("expert performances"), and working on a meaningful project for later use in their own classroom ("complex authentic activities," "authentic assessment") form a set of critical conditions (Herrington & Oliver, 1999). We are the first to acknowledge that the short time of this experience (five days) is not enough to convert students into full-fledged, sophisticated, technology-using teachers, despite the unusually low student-to-instructor ratio, given the presence of three instructors in each session (see also Naubert & Binko, 1998). Intensive workshops like this course definitely benefit from having more than one instructor, given the number of hours meeting each day, though we acknowledge that co-teaching arrangements are not always easy to achieve. Longer sessions (e.g., summer institutes lasting three to five weeks) are more likely to increase the comfort levels, proficiency, and likelihood of sustained use of technology (Ringstaff, Yocam, & Marsh, 1996) although these almost always would require more than one instructor.

Bitner and Bitner (2002) wrote that "Teaching models using technology as a tool in the classroom to help students achieve must be provided. Teachers need to conceptualize how the use of various programs which facilitate teaching and learning [sic]. This can more easily be done if they actually see students using technology that has been integrated into the curriculum" (p. 97). In this experience, our students witnessed firsthand what a technology-rich school looks like, but perhaps more importantly, how teachers and students have successfully redefined their roles to take maximum advantage of the possibilities offered by the new tech-

nologies. It is clear to us that the development of hands-on skills with specific applications and their uses in the classroom (and for personal productivity) should be an important component of any effort to promote technology integration. The context and purposes in and for which those applications will be used makes a critical difference for prospective teachers. To the extent that preservice coursework can take place in a more authentic context, the better prospective teachers' attitudes toward technology and the likelihood of continued use will be.

Beyond the challenges involved with replicating this course in the future, teacher preparation programs need to identify ways to provide followup and ongoing support to the students (Bradshaw, 2002; Brush et al., 2001), perhaps working in cooperation with districts, statewide agencies, and other organizations interested in helping new teachers be successful in the profession, such as the University of California's Beginning Teacher Support and Assessment (BTSA) program and the California Subject Matter Projects (CSMP). Because the class project was a lesson or unit plan that students designed for use in their own classroom, we would like to see students communicate formally with us (faculty) without requiring it as a component of the course evaluation. Once students walk out of the university classroom, the expectation for future interaction is over—except in cases such as this one, where we would be interested in finding out how the lesson or unit delivery worked out. We would also be willing to assist, if in no other way, simply by being there as external advisors. One strategy we are contemplating as a department is to set up a bulletin board-type online communication and collaboration system (e.g., FirstClass), which would be available to students even after graduation and as a forum for peer support as well. In the meantime, our students were encouraged to make use of resources such as BTSA, CSMP, and others that are free of charge and can be a great source of information and professional support.

Finally, thanks to this experience, our students became more aware of the factors involved in successful technology integration at the personal, school, and even district level. Although the course was focused on development of their individual technology and teaching skills, the lunchtime conversations with the school teachers and the principal helped them understand that "The likelihood of the average teacher being motivated to use technology to change their classroom is more likely when both administration and valued colleagues agree" (Berg, Ridenour Benz, Lasley II, & Raisch, 1998, p. 119). In the end, we hope that our students have come to see each other as colleagues willing and able to offer technical help and other types of support as they find their own path toward a teaching practice that incorporates technology in meaningful ways.

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